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A PROFITABLE TENANT DAIRY FARM.

BY

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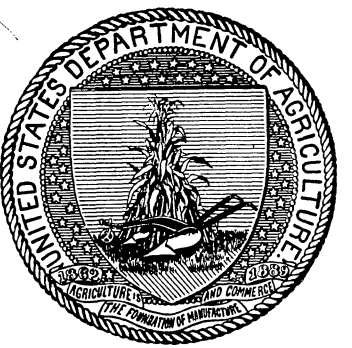

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U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., February 11, 1907.

SIR: I have the honor to transmit herewith a paper entitled "A Profitable Tenant Dairy Farm," by Mr. Lyman Carrier, Scientific Assistant, prepared under the direction of the Agriculturist in Charge of Farm Management Investigations, and recommend that it be published as a Farmers' Bulletin.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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A PROFITABLE TENANT DAIRY FARM.

INTRODUCTION.

It is seldom that a tenant farmer pays much attention to increasing soil fertility. Run-down and worn-out farms that have been "worked on shares" in all the old settled sections prove the truth of this statement. A rented farm where both owner and tenant are receiving adequate compensation for their investment and services and where ample returns are made to the soil to insure larger and better yields with each succeeding year should attract more than passing notice. Such conditions exist on a farm located in southern Michigan. It is a dairy farm of 120 acres, of which 106 acres are tillable, 2½ acres are in natural pasture, and the remainder is taken up by lanes, roads, and yards about the buildings.

Prior to October, 1905, the farm and buildings represented an investment by the owner, Mr. J. N. Neal, of $12,500, from which he received a net yearly income of $1,500, or 12 per cent on his investment. The management of the farm occupied none of his attention; he was as free to devote his time to other business matters as if his money had been invested in bonds or mortgages. The tenant-manager, Mr. Charles J. Angevine, has been on the place thirteen years, and to him must be given the credit for the excellent condition of the farm and for the large crops produced.

CONTRACT FOR THE OPERATION OF THIS FARM.

The agreement under which the business is carried on is this: Each man owns half the dairy herd. The manager furnishes the horses and ordinary farm implements, such as plows, wagons, and harrows. Machinery that belongs permanently on the farm, such as engines and silage cutters, and the general expenses of running the place are paid for out of the undivided receipts. After all the expenses are paid the net proceeds are divided equally.

Mr. Neal keeps no record whatever of the gross income. This may seem unbusinesslike, but his policy has been to hold the tenant alone responsible for a net income sufficiently large to make the investment profitable. When an improvement on the farm is wanted the question asked the tenant is "Can you make it pay?" No restrictions

as to what shall or shall not be done enter into the contract. Results are the only things demanded. The new buildings that are described later will cost more than $10,000. It will be seen that the manager has an interesting problem to solve. To increase the net proceeds nearly twofold, so as to make profits on this added investment, is a big undertaking, but neither the landlord nor the tenant is at all pessimistic about the outcome.

FARM ANIMALS.

In October, 1905, a fire destroyed all of the barns and silos, with the exception of one silo and a stable where the young stock was kept, and also destroyed the hay and feed that had been stored for the winter. This necessitated building temporary quarters for the winter of 1905–6 and the summer following; also of disposing of several cows for lack of room and fodder. The work of building new and larger barns was begun in the spring of 1906, and these are now nearing completion. But even with the adverse conditions under which the work has been done this past year, there are on this farm of 120 acres 60 cows, 43 calves and yearlings, 2 bulls, and 9 horses. Nearly all of the roughage fed these animals is grown on the place. Concentrates, such as cotton-seed meal, oil meal, and bran, are purchased. It is the purpose of the owners to increase the number of animals in the herd to 150. In 1894 they began dairy operations with 17 cows and 4 horses. The number of cows was increased to 30 in six years, and to the present number in the next seven.

Being dissatisfied with the ordinary dairy cows that were offered for sale, the owners began several years ago to raise their own stock. Each milking is weighed and an accurate record is kept of the performance of every cow. The unprofitable ones are disposed of as soon as possible. Pure-bred Guernsey bulls are used and only the heifers from the best producing cows are saved for the herd. In this way a herd has been developed whose yearly record averages nearly 7,000 pounds of milk per cow. Some of the grade Guernsey heifers at three years of age have made better records than their dams ever did. The proportion of calves and yearlings to milch cows at present on the place is unusually high. This is because of a wish to increase the size of the herd considerably in the next two years.

MANAGEMENT OF THE HERD.

The cows are put in their stalls the first of October and are not let out until warm weather in the spring. The rest of the year they are let out during part of the day in the small pasture lot to give them exercise. The young stock and dry cows are kept in separate yards from the others. These are to be stabled in the quarters now

occupied by the entire herd when the milch cows are transferred to the new barn.

RATIONS.

The plan of feeding is the same in summer as in winter. The cows are fed grain in the morning before milking. After milking they get silage; alfalfa hay is fed at noon, and the grain and silage again at night. New milch cows get all they will eat of these different feeds. The quantities are gradually diminished as the period of lactation advances.

The young stock and dry cows receive more coarse fodder, such as corn stover, silage, and rye hay, and less grain than do milch cows.

Corn silage would be fed the entire year if a sufficient quantity were available. It has been found necessary at various times to substitute for it some other succulent feeds, such as beet pulp, green alfalfa, and apple pomace. The experience with apple pomace on this place indicates that not enough attention has been paid to this by-product as a feed for dairy cows. When fed in alternate periods with beet pulp the cows shrink in milk flow when on the pulp and gain when put back on the apple pomace. The pomace was stored in a long pile and covered with cornstalks. It kept fairly well under these conditions for two months. Pomace stored in casks, which is practically the same as putting it in a silo, has been known to keep perfectly for seven months.[a] In a feeding trial at the Vermont Agricultural Experiment Station, lasting two hundred and seventy days, eight cows receiving apple pomace gave the same amount of milk and 3 per cent more butter than when fed corn silage.[b] Care should be taken in getting cows accustomed to this feed. They eat it very readily and would no doubt eat too much at first if given all they wanted. Mr. Angevine gives about half a bushel to each cow twice daily.

Soiling is not practiced except when absolutely necessary. The manager considers silage in every way as good a feed as green crops, and more economical.

Bran forms the basis of the grain ration, and is often the only concentrate used. It is fed the whole year. Equal parts by weight of cotton-seed meal, oil meal, and bran were tried, and gave good results.

CROPPING SYSTEM.

There is no fixed rotation of crops practiced on this place, corn having been planted after corn on the same land in some instances for seven years. The liberal dressing of manure which the whole farm

[a] Fourth Annual Report of the Hatch Experiment Station of the Massachusetts Agricultural College.

[b] Fifteenth Annual Report of the Vermont Agricultural Experiment Station.

receives each year makes this possible. One field of 18 acres gave a yield of 400 bushels of shelled corn in 1894. After three years of continuous cropping with corn it gave a yield of 1,200 bushels. Meantime it had received 500 loads of manure hauled from the city. To quote the manager: "Two corn crops in succession on the same field may not sound like good farming, but the best farming I have done on this place was the growing of seven crops of corn on the same field in nine years. The first crop would not have made over 5 tons of silage per acre, and the last one made 25 tons."[a]

While, as before stated, no regular plan is followed in planting the crops, a system, extremely simple in outline, that promises maximum yields of forage is gradually being developed. It is corn and alfalfa in about equal areas, with winter rye whenever it can be crowded in between two crops of corn, and oats when necessary to get a new seeding of alfalfa. Both the rye and oats are cut for hay.

Special care is taken in producing the corn that is to go into the silo. A large kind of ensilage corn is planted on well-manured and thoroughly prepared land. The field of corn that made 25 tons of silage per acre in 1905 received two coverings of stable manure—one during the early winter and the other just before plowing in the spring.

Marked success has resulted from seeding corn stubble with rye, cutting the rye for hay, and planting the same field to corn again. From a 10-acre field cropped in this manner four big loads of rye and 15 tons of silage to the acre were harvested this year.

The following table shows the acreage of crops grown during 1905 and 1906 and the plans for 1907:

System of cropping for 1905, 1906, and 1907.

Field number.	Acreage.	Crop, 1905.	Crop, 1906.	Crop, 1907.
1	17	Timothy hay	Pasture	Corn.
2	24	Pasture	Corn, sowed to rye	Rye, to be cut for hay and followed by corn.
3	32	Corn	13 acres in corn	13 acres in corn.
			18 acres in oats; seeded to alfalfa.	19 acres in alfalfa.
			1 acre in rye; seeded to alfalfa.	
4	13	Oats, cut for hay; seeded to alfalfa.	Alfalfa	Alfalfa.
5	10	Oats, cut for grain; seeded to rye.	Rye, followed by corn; seeded to rye.	Rye, to be cut for hay and seeded to alfalfa.
6	10	Alfalfa	Alfalfa	Alfalfa.

In addition there is a pasture of 2½ acres, which is never plowed.

[a] In localities where fungous diseases or insect pests, such as the root aphis and the rootworm, attack the corn crop, this practice would be disastrous. As yet in the section under discussion no trouble has been experienced from these sources.

It will be seen from the foregoing table that 32 acres were in corn in 1905 and 47 acres in 1906, and that there are to be 54 acres planted to this crop in 1907.

Four years ago a 10-acre field was sown to alfalfa as an experiment. It did so well that the area devoted to this crop has been increased from 10 acres in 1905 to 23 acres in 1906, and this is to be increased to 52 acres in 1907.

Seeding alfalfa both with and after oats or rye has been successful. The plan usually followed is to disk the ground thoroughly after an oat crop has been removed and sow the alfalfa in August. The ground in 1906 was worked until it was so mellow a wheelbarrow grass seeder could not be pushed over it. Where the land has never produced alfalfa, it has been the practice to inoculate it with two or three wagonloads of pulverized sweet clover (*Melilotus alba*) sod to 10 acres. This plant grows in great abundance along the highways in this part of Michigan. On 6 acres that were seeded to alfalfa in 1906, three applications of manure, of 8 loads each per acre, were made before seeding. The field was disked after each application.

The alfalfa is cut for hay three times during the season. After the first cutting in the spring the stubble is gone over with a disk harrow. In case June grass gets started it is disked twice during the year. The stand of alfalfa on this place is as good as any the writer has ever seen.

BUILDINGS.

The buildings that escaped the fire were the dwelling house where the tenant lives, one small frame stable, and an adjoining stave silo. This stable stands about 15 rods from the other barns and will be used for housing the young stock and dry cows. The silo has a capacity of about 100 tons.

In building the new barns (fig. 1) care was taken to make them as nearly fireproof as possible. The ground plan of the barns is in the form of an L. The hay barn is 120 feet long, 38 feet wide, and 24 feet high to the eaves. The walls are of hollow reenforced concrete. Galvanized-iron shingles were used on the roof and to cover the gables. In this barn are horse stable, granary, feed room, and hay mows. The horse stable and granary are situated at one end of the barn and are separated by an 8-foot feed alley. There is also a central driveway crosswise of the barn. At the rear of this main barn are two circular, solid-walled, reenforced-concrete silos. These are 20 feet in diameter and 41 feet high. The silos are about 8 feet apart. Extending back from the silos and at right angles to the longer dimension of the hay barn is the cow stable (fig. 2). This is 38 feet wide and 154 feet long. The inside height is 8 feet 4 inches in the clear. There is no wood in this stable except that used in making the

stalls and feed boxes. The walls, floor, roof, crossbeams, and even the pillars that support the roof are made of reenforced concrete. Fifty-seven windows in the walls, each 24 by 40 inches in size, and three skylights in the roof furnish plenty of light. The King system of ventilation was installed. The double walls made this an easy matter. For the intake of fresh air, flues about 4 by 8 inches are partitioned off in the walls about every 10 feet, and extend from the bottom to the top of the wall. The outside opening to this flue is about a foot above the ground. The inside opening is near the ceiling. To remove the foul air two circular chimneys, with an inside diameter of 3 feet 4 inches and a height of 50 feet, were built, one

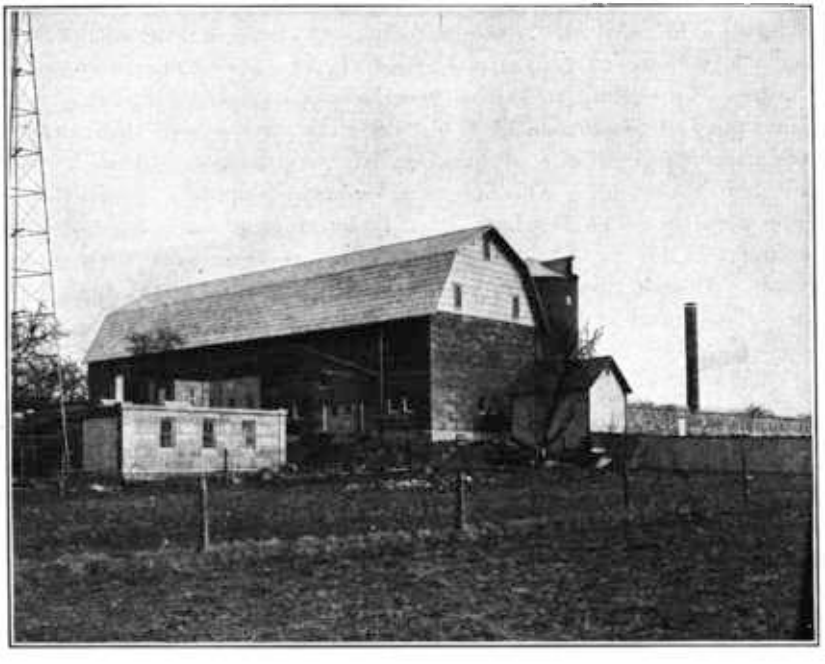

FIG. 1.—Concrete barns on the farm of J. N. Neal.

near each end of the stable. These were placed at one side of the central feeding alley. The walls of these chimneys are solid reenforced concrete, being 6 inches thick for the first 10 feet and for the remainder 4½ inches. Six 10 by 12 inch openings are left at the bottom of the wall of each stack for the intake of air and heavy gases.

Two rows of stalls facing a central feeding alley extend the whole length of the stable. The essential feature of the kind of stall used is the movable front, which can be adjusted according to the length of the cow. With this device and a gutter behind them the cows can

be compelled to keep clean. An individual drinking trough is in every stall. The ceiling of the cow stable is fitted with tracks for litter and feed carriers. The roof is carried through between the two silos, forming a covered passageway which connects the feeding alley of the cow stable with the alley of the hay barn.

About 45 feet in front of the main barn and at one side of the driveway is the milk house. This building is 20 by 26 feet, one story in height, with a receiving tower at the corner nearest the barn. The ground between the storage barn and the milk house descends quite rapidly, so that the roof of the milk house—which is the floor of the receiving tower—is on a level with the floor of the

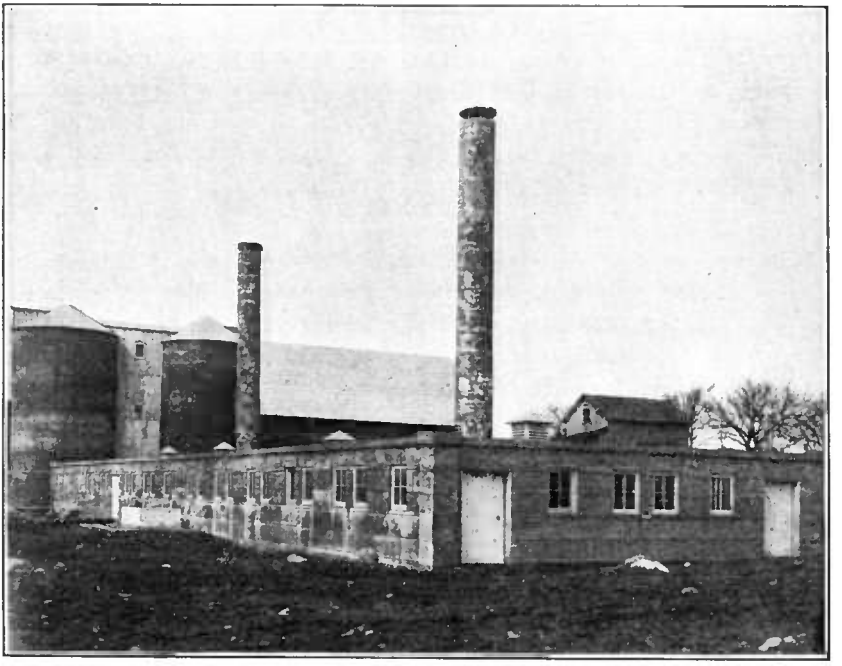

FIG. 2.—The cow stable, showing ventilating chimneys, with the silos in the distance.

barn. This intervening space has been filled in with dirt. As soon as it is drawn, the milk is poured into 10-gallon cans and wheeled to the front door of the barn. The can is then suspended from a car on a taut wire cable, which extends from the barn to the milk house, and is run to the receiving tower. The milk is poured through a strainer in the floor of the tower on to the aerator. The milkers do not have to enter the cooling room at all. Reenforced concrete is used exclusively in the construction of the walls, floor, tanks, roof, and chimney of this building. The walls are hollow, like those of the barn.

HIRED HELP.

Five men are employed the year round. These men have been on the place from two to seven years. Four of them milk from 10 to 15 cows each. Two of the milkers drive the delivery wagons on the city milk route and take care of the cans and milking utensils. One attends to feeding the stock and to the chores about the barns. The fourth while not milking is engaged at labor in the fields. One man devotes his entire time to general work in the fields. A few day hands are hired during busy times, such as the haying and silo-filling seasons.

HOURS OF WORK.

The milking takes about two hours twice a day. It is the first work done in the morning, commencing at 4.30, and is finished in the evening at 6 o'clock. It takes the two men who drive the milk wagons about five hours to deliver the milk and one hour to take care of the wagons and cans. The farm men work about nine hours in the field.

WAGES.

The two men who drive the milk wagons receive $25 a month. The barn man gets $6 a week. One farm hand is paid $23 a month; the other, a boy, $18 a month. The wages paid the temporary help vary from 50 cents a day for boys to $2.50 a day for skilled men. All of the laborers are furnished board.

HANDLING MANURE.

Sawdust is used for bedding in the stalls and as an absorbent. This renders the manure especially adaptable for disking in, as in the case of fitting oat stubble for alfalfa. No ill effects on the soil have ever been noticed from the use of this material.

A litter carrier, suspended from an overhead track, carries the manure from the stable and dumps it on a manure spreader. The spreader (fig. 3) stands on a rectangular cement foundation, built with sides about 2 feet above the floor. The ends of the floor are raised so that any drippings from the spreader can not escape, but not high enough to prevent driving the spreader on or off. By keeping some absorbent litter, which is changed when necessary, on this foundation all the liquid, as well as the solid manure, is saved without recourse to a manure cistern. A roof over this foundation, supported by 7-foot posts, keeps off rain and snow. The manure is hauled to the fields daily. Experience has shown that it injures the texture of the soil very much to drive a loaded wagon over it when it is too wet. To avoid this trouble, the building in the near future of a shed large enough to store the manure accumulating during the wet periods of

the year is contemplated. In the past it has been the custom to haul from 400 to 500 loads of manure a year from the city, but this is not practiced any more, enough being produced by the herd to cover the whole farm with 6 to 8 tons to the acre each year. Commercial fertilizers have been tried in small quantities, but their use has been abandoned.

EQUIPMENT.

The implements and machinery in use on this farm are three wagons, two disk harrows, one smoothing harrow, two walking plows,

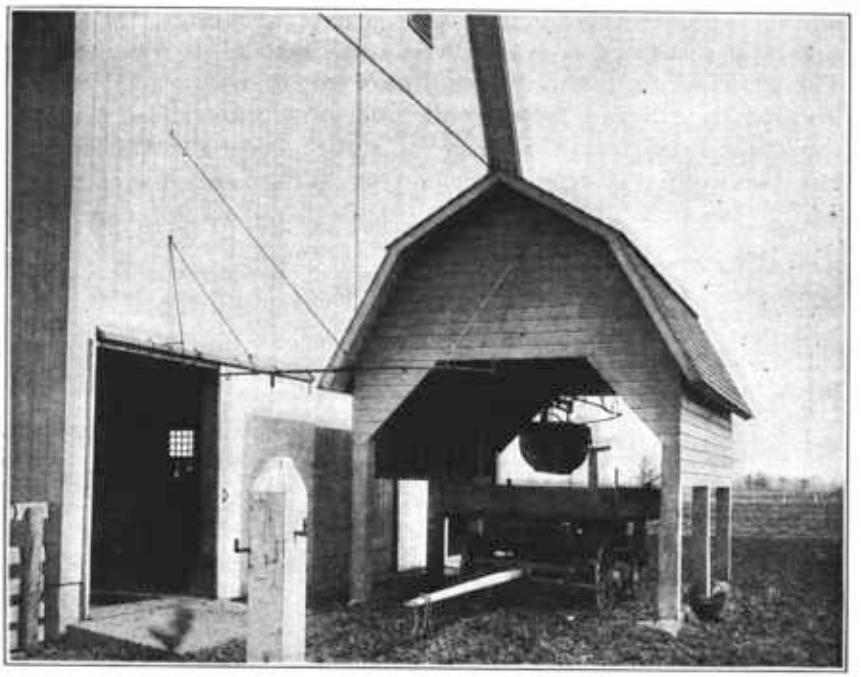

FIG. 3.—The shed where the manure spreader stands.

one gang disk plow, two 2-horse cultivators, one corn binder, one mowing machine, one 2-row cultivator, one manure spreader, one weeder, one combined fertilizer and grain drill, one 15-horsepower gasoline engine, and one silage cutter. "One of the best tools is a float made of three 8-foot poles, weighted so as to make a good load for three heavy horses."

DISPOSAL OF PRODUCT.

Most of the milk from the dairy is retailed in a near-by city. Two delivery wagons are used. There are several first-class dairies supplying this same market, and the competition is very keen. The finan-

cial success of this farm can not therefore be attributed to high prices received for the milk. The usual rate is 5 cents a quart for whole milk delivered to the consumer.

FINANCIAL STATEMENT FOR 1905.

It is impossible to give an exact itemized statement of expenses or of returns. Hence the following table contains only round numbers. These, however, are believed to be substantially correct.

The figures are for the year 1905. During that year the herd contained 45 cows. About one-third of the milk was sold at wholesale at 4 cents a quart and the remainder at retail at 5 cents. Some days there was a surplus, and there were occasional losses from accident. The principal loss, however, resulted from the failure of drivers to keep accurate records of all milk sold on account. Mr. Angevine thinks the losses from this source alone were more than $1,000. He now uses a ticket system, which prevents most of this loss.

Receipts and expenditures, 1905.

Receipts for milk retailed		$5,500
Miscellaneous receipts for hogs, calves, chickens, etc		500
Total receipts		6,000
Paid out for feed	$1,000	
Labor, five regular hands	1,404	
Labor (day help) and other expenses	596	
Total expenses		3,000
Net proceeds		3,000

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